SOUTH CENTRAL TENNESSEE WORKFORCE ALLIANCE

2016 Labor and Education Alignment Program (LEAP)

Mechatronics Accelerated Completion Program (MAC Pro)

IN PARTNERSHIP WITH

1. Columbia State Community College
2. Williamson County Public Schools
3. Maury County Public Schools
4. Nissan
5. APCOM
6. AOC Metals
7. Horn USA
8. Lasko products
9. Southeastern Manufacturing
10. GCP Applied Technologies
11. Accurate Energetic Systems
12. Columbia Machine Works

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Funding Requested:
$ 953,488.95

Higher Education Institution
President, Columbia State
Community College

Janet Smith

Project Director, Lead Entity
Executive Director, South Central
TN Workforce Alliance

Jan McKeel

MECHATRONICS ACCELERATED COMPLETION PROGRAM

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ABSTRACT

The *Mechatronics Accelerated Completion Program* (MAC Pro) will fund the expansion of an academic collaboration between the South Central Tennessee Workforce Alliance (SCTWA), Columbia State Community College (CoSCC), two school districts, and various local businesses. Based on the upsurge of high tech manufacturing in Middle Tennessee, there is a need to increase the available educational opportunities for students that will provide those highly valued skill sets and do so in a manner as to increase the number of graduates with on the job training in a timelier manner. The final result of the project will provide a path for an accelerated completion of an Associates of Applied Science in Advanced Integrated Industrial Technology with an option in Mechatronics. In the timeframe of this grant, approximately 180 students will have the opportunity of completing the requirements for a high school diploma and a college degree in the same semester through a combination of dual credit and dual enrollment courses.

Students will learn the concepts and applications of electronics, hydraulics, pneumatics, and robotics for today's highly technical manufacturing using the same lab equipment and lecture format as those attending regular classes at Columbia State. As a part of the coursework, the students will participate in internships at local industries to gain hands-on experiences. These internships will be paid and will introduce students to leaders in the field, increasing their chances of obtaining a job after completing the program. Allocations will be directed towards equipment purchases and funding a coordinators position.

The total amount requested for the program is $953,488.95.

LEAP 2.0 Program Proposal

SECTION 1- PROGRAM NEED

Tennessee's labor reports indicate the skill sets mastered by students completing this program will be in demand for well-paying jobs. Tennessee department of labor statistics indicates over 325,000 Tennesseans are employed in production of manufactured goods with an average annual growth rate of 0.37% (TN Dept. of Labor & Workforce Development, 2015). Careercoach.com states that the positions most related to this academic program, electronics engineering technology, electro-mechanical technology, industrial engineering technology, industrial maintenance, and industrial machine mechanics are plentiful in the service area of Columbia State Community College (CoSCC) with 10,636 employed. Job growth rate is estimated at 3.8% annually with 388 annual open positions for graduates. 24% of the current workforce in this area are near retirement age which will potentially create 2,557 openings in the next 10 years.

By forming this collaboration, the MAC Pro will also serve to support the state policies put forth through the governor's Drive to 55 initiative. Local and regional businesses in this grant will now be directly supporting local education and be aligned with the Drive to 55's Alliance plan. As this academic program has no set end date, the businesses will become invested in these students, see the value of the students in their workforce, and reap the benefit of a stronger local workforce development for years to come.

Additionally, by offering education in a field that students are already interested in, the program encourages student retention and a potential increase in enrolled students. As TN Promise and the Drive to 55 initiatives continue, the students are assured relevant programs of study with business mentors to guide them.

Dual enrollment and early college course completion have been cited in literature as having positive impacts on students. College completion rates are higher and overall high school experiences are better for dual enrolled students (Haxton, Song, Zeiser, Berger, Backici, Garet, Knudson, & Hoshen, 2016). Dual enrollment is positively related to stronger college academic performance, retention, and college outcomes for two-year technical college students (Wang, Chan, Phelps, & Washbon, 2015). Research in North Carolina demonstrates that early college enrollment reduces suspensions, improves attendance, and increases the number of students prepared for college work (Edmunds, 2010).

Potential employers for graduates of MAC Pro operate manufacturing and manufacturing related businesses throughout Middle Tennessee. Industry partners of the grant are located in Rutherford, Maury, Williamson, and Lawrence counties.

SECTION 2- PROGRAM PLAN

The product of this grant will be an expansion of the existing Advanced Integrated Industrial Technology (AIIT) Associates of Applied Science academic program at Columbia State. Williamson County Schools (WCS) and Maury County Schools (MCS) students will be able to complete a Mechatronics concentration within the AIIT program concurrently with high school graduation. A combination of dual credit and dual enrollment courses will provide college level instruction to high school students at Fairview High School (FHS) in Williamson County. Fairview students will have access to an in-house AIIT/Mechatronics lab which is currently partially equipped. Maury County students will have dual credit AIIT/Mechatronics opportunities with labs equipped for the first semester AIIT courses at 3 high schools and enroll in dual enrollment courses at the Northfield AIIT lab. Work based learning in the form of internships with local manufactures will be required of all students. The internships are

incorporated into the curriculum as graded course with learning outcomes as outlined in Appendix D. Instructors assigned to internship classes will monitor student progress via site visits and communications with student supervisors. The total number of students impacted by this initiative for the time frame of the grant is projected to be 180 with approximately 100 students taking part in work based learning. SCTWA will coordinate work based learning opportunities and reimburse industry partners for work based learning student salaries up to $1,000 per student.

Dual credit articulation agreements for specific AIIT/Mechatronics courses were signed with WCS and MCS in spring 2016 (Appendices B & C). A memorandum of understanding (MOU) outlining three phases of program implementation, building access, and equipment sharing was signed with WCS in spring 2016 (Appendix B). Equipment for Phase I of the FHS portion of the program has been purchased.

The timeline for the grant is as follows:

January 2016- July 2016

- *Articulation agreements signed for dual credit courses in Williamson and Maury Counties.*
- *MOU signed with Williamson County for use of Fairview lab and sharing of equipment costs.*
- *Equipment for Phase I of Williamson MOU purchased.*
- *Fairview instructor trained on lab equipment.*

August 2016- July 2017:

- *MAC Pro Coordinator will be hired and begin oversight of program implementation and begin compiling monthly reports*
- *First cohort of students will enroll in articulated dual credit courses at Fairview High School and 3 Maury County High Schools.*
- *Equipment for dual credit courses will be purchased and installed at the 3 Maury Co. Schools. (Equipment for Fairview dual credit courses will be already be in place.)*
- *Equipment for Fairview dual enrollment courses will be ordered.*

- *Equipment for Maury Co. dual enrollment courses will be ordered.*

August 2017- July 2018:

- *MAC Pro Coordinator will complete first annual report.*
- *First cohort of students will enroll in dual enrollment courses at Fairview High School.*
- *First cohort of Maury County students will enroll in dual enrollment courses at Columbia State's Northfield lab.*
- *Second cohort of students will enroll in dual credit courses.*
- *First cohort of students will begin participation in internships.*
- *All equipment will be in place.*

August 2018- June 2019:

- *MAC Pro Coordinator will complete second annual report.*
- *First cohort of students will enroll in final dual enrollment courses.*
- *Second cohort of students will enroll in dual enrollment courses.*
- *Third cohort of students will enroll in dual credit courses.*
- *Second cohort will participate in internships.*

MAC Pro will be led by a steering committee made of representatives from all of the major partners. The committee will be led by Jan McKeel of the SCTWA and Dean Dearl Lampley of COSCC. Businesses, schools, and a community leader will represent Maury and Williamson counties. At this time, about eight people are expected to serve on the committee, which will meet each semester (biannually) to discuss the progress of the program. The academic portion of the grant will be monitored by a small committee of faculty from CoSCC, WCS, and MCS. Dean Lampley will lead the committee and his vitae is included in the Appendices Measurable objectives will be collected and analyzed at various phases of the program. Dual credit courses will be monitored for completion and success rates on final exams. Completion rates for dual enrollment classes will be compared to the typical college sections. Work based

learning experiences for MAC Pro students will be evaluated separately from other AIIT students. The administration of employer satisfaction with graduates surveys are standard practice for AIIT. These surveys will be delineated by MAC Pro and typical AIIT graduates for analysis.

SECTION 3- STRENGTH OF PARTNERSHIP

The South Central Tennessee Workforce Alliance (SCTWA) will be the lead entity for MAC Pro grant. The SCTWA's mission is "acting as a catalyst for collaboration among job seekers, employers, and workforce development partners. By developing a system that improves opportunities for the successful linking of job seekers and employers, the Alliance will help to create economic opportunity" (South Central Tennessee 1). Collaborating with both the local education institutions as well as the businesses will ensure that an economically beneficial pipeline is created in the technology sector. As the lead entity, the SCTWA agrees to hold the primary responsibility for monitoring the progress of the grant and acting as a liaison between the education, business, and community leaders.

Based on the location of this agency, the Columbia State Community College (CoSCC) is the best higher education institution partner for this grant. CoSCC has five campuses spread throughout nine counties in the south central region of Tennessee and has a total student population exceeding 5,400. As a community college, CoSCC recognizes its role in developing programs that feed the needs of today's economy in areas that will give the students marketable skills. In addition to running the academic portion of the grant, CoSCC will retain the financial responsibility of the grant as dictated by the request for proposals. This is especially appropriate as the equipment purchased for the MAC Pro will be the property of the college once the grant concludes and will continue to serve future students.

High schools from both counties are ready to partner on the grant and have discussed the need for this type of project and the value it will provide for their students as well as others. In the case of the Williamson County School partner, Fairview High School, the AIIT/Mechatronics lab will be used by traditional CoSCC students after regular school hours. A summer robotics camp for middle and high school teachers is also a long-term goal of integrating this program more broadly in the school district.

The business partners will provide paid internships to the students enrolled at CoSCC. SCTWA will act as the hiring agent and coordinator for internships. SCTWA will oversee the reimbursement of industry wages for interns at a maximum of $1,000 per student. In this capacity, SCWTA will provide a repository of interns to all companies in the area with priority given to those with a high need of skilled workers. SCTWA will hire a coordinator to perform these duties as well as to oversee the implementation of the program at the high schools and compile and submit all reports. As the program continues and then becomes sustained by CoSCC, businesses will continually be solicited to ensure that all students are afforded internship opportunities. The equipment is very durable with an expected useful life span of 10 years. Duties and responsibilities of the MAC Pro Coordinator will diminish as the program matures. Remaining obligations will be assumed by the AIIT staff.

SECTION 4- BUDGET PLAN:

The grand total of grant money for this grant is $953,488.95.

The majority of funds will go towards purchase of equipment and materials needed for student instruction. All equipment will be produced by Amatrol in order to align with existing curriculum and labs. A program coordinator will be hired for the duration of the grant to implement, oversee, and report on progress of all aspects of the grant.

MAC Pro Coordinator

30 months salary @ $30,000 annually + annual benefits (40.1%)

Total- $105,075

Internship Reimbursement

100 students @ $1,000 each

Workman's Comp- $10,000

Total- $110,000

Williamson County Schools:

1- Mechatronics Unit- $171,712.00

Total WCS. - $171,712.00

Maury County Schools:

3 -Basic Electricity Trainers (T7017) @ $5,350 each- $16,050

9- Work Stations (82-610) @ $1,230 each- $11,070

3- Power Development Trainers (85-MT2) @ $11,180.22 each - $33,540.66

3- Photo Tachometer (18414) @ $530 each- $1,590

3- Hydraulic/Pneumatic Trainers (850-H1 & 85-IH) @ $19,087.26 - $57,261.78

3- Principles of Instrumentation Trainers (T5552 & T5552-C1-A) @ $18,766.98 - $56,300.94

3- Electrical Power Distribution Trainers (85-MT7-B & 82-612-E w/ consumables) @ $25,469.36- $76,408.08

3- Pneumatics Trainers (850-P1and 85 IP) @ $7,868.28 - $23,604.84

3- Piping, Pneumatic and Installation Trainers (950-PS1 w/ accessories) @ $30,943.50 - $92,830.50

3- Mechanical Installation Trainers (950- ME1 w/ accessories) @ $39,638.78 - $118,916.34

Hand tools and consumables (oil, etc.) - $7,000

Installation and setup- $1,500

*Total MCS- $*496,073.14

Total direct costs for the project - $882,860.14

SECTION 5- SUSTAINABILITY:

Once the grant period ends, the established academic programs will be continued. The equipment purchased to establish new labs will be very durable with expected lifespan of ten years. The anticipated relevance of the equipment to industry need is a minimum of 15-20 years. The program faculty members will remain current on the technology advances in the Mechatronics/Advanced Manufacturing Fields. Tuition will sustain the instructional program.

The college will continue to send students to the local businesses for the internship portion of the curriculum and work to build relationships with any new related companies. At the end of the grant, employers will pay the entire amount of internship salaries. The various partners in this grant will maintain contact through local workforce meetings and through faculty and business meetings for the purpose of arranging internships.

Industry representatives will continue to participate in the AIIT Advisory Committee to assure that the program meets the employment needs of the manufacturing employees and the curriculum is up to date and relevant to the workforce. This advisory groups meets bi-annually, have documented minutes of their meetings, and serve as the basis for program changes. Certification by the Association of Technology, Management, and Applied Engineering for AIIT will continue.

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APPENDIX A: GRANT BUDGET AND LINE-ITEM DETAIL

GRANT BUDGET

2016 Labor and Education Alignment Program (LEAP 2.0)

The grant budget line-item amounts below shall be applicable only to expenses incurred during the following applicable period:

BEGIN: September 1, 2016 END: December 1, 2018

POLICY 03 Object Line-item Reference	EXPENSE OBJECT LINE-ITEM CATEGORY	GRANT CONTRACT	GRANTEE PARTICIPATION	TOTAL PROJECT
1, 2	Salaries, Benefits & Taxes	$105,075.00		$105,075.00
4, 15	Professional Fee, Grant & Award	$110,000.00		$110,000.00
5, 6, 7, 8, 9, 10	Supplies, Telephone, Postage & Shipping, Occupancy, Equipment Rental & Maintenance, Printing & Publications	$8,500.00		$8,500.00
11, 12	Travel, Conferences & Meetings			
18	Other Non-Personnel			
20	Capital Purchase	$659,285.14		$659,285.14
22	Indirect Cost	$70,628.81		$70,628.81
24	In-Kind Expense			
25	**GRAND TOTAL**	**$953,488.95**		**$953,488.95**

Grant budget line-item detail:

Salaries, Benefits & Taxes	AMOUNT
MACPro Coordinator (30 months @ $30,000 annually)	$75,000.00
Benefits (30 months @ 40.1%)	$30,075.00
TOTAL	$105,075.00

Professional Fee, Grant & Award	AMOUNT
Internship reimbursement (100 students @ $1,000 each)	$100,000.00
Worker's Comp (10%)	$10,000.00
TOTAL	$110,000.00

Supplies, Telephone, Postage & Shipping, Occupancy, Equipment Rental & Maintenance, Printing & Publications	AMOUNT
Hand tools and consumables (oil, etc.)	$7,000.00
Installation and setup of equipment	$1,500.00
TOTAL	$8,500.00

Capital Purchase	AMOUNT
Williamson County Schools Subtotal	$171,712.00
1x Mechatronics Unit	$171,712.00
Maury County Schools Subtotal	$487,573.14
3x Basic Electricity Trainers (T7017, $5,350 ea.)	$16,050.00
9x Work Stations (82-610, $1,230 ea.)	$11,070.00
3x Power Development Trainers (85-MT2, $11,180.22 ea.)	$33,540.66
3x Photo Tachometer (18414, $530 ea.)	$1,590.00
3x Hydraulic/Pneumatic Trainers (850-H1 & 85-IH, $19,087.26 ea.)	$57,261.78
3x Principles of Instrumentation Trainers (T5552 & T5552-C1A, $18,766.98 ea.)	$56,300.94
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3x Pneumatics Trainers (850-P1 & 85-IP, $7,868.28 ea.)	$23,604.84
3x Piping, Pneumatic Installation Trainers (950-PS1 w/ accessories, $30,943.50 ea.)	$92,830.50
3x Mechanical Installation Trainers (950-ME1 w/ accessories, $39,638.78 ea.)	$118,916.34
TOTAL	$659,285.14

AGREEMENT BETWEEN
THE WILLIAMSON COUNTY BOARD OF EDUCATION
and
COLUMBIA STATE COMMUNITY COLLEGE
for
PROVIDING MECHATRONICS EQUIPMENT AND MECHATRONICS CLASSES
AT
FAIRVIEW HIGH SCHOOL

This Agreement is entered into this the 15 day of March, 2016, by and between the **Williamson County Board of Education** of Franklin, TN (hereinafter "WCS"), and **Columbia State Community College** of Columbia and Franklin, TN (hereinafter "CSCC").

WITNESSETH

WHEREAS, CSCC desires to provide mechatronics-based education to its students at Fairview High School, 2595 Fairview Blvd, Fairview, TN (hereinafter "Fairview" or "the Premises"); and

WHEREAS, WCS desires to provide a facility for such use and make available to its students CSCC equipment during the regular high school day; and

WHEREAS, WCS and CSCC desire to facilitate increased high school participation in joint enrollment Mechatronics coursework in three Phases with a ultimate goal of an embedded AAS Degree as Phase III in 2018-19 (see appendix A) pending attainment of grant funding. Phase I consists of dual credit courses in 2016-17(see appendix B) and Phase II consists of an embedded Technical Certificate in 2017-18 (see appendix C);

WHEREAS, WCS and CSCC agree that it is appropriate for parties hereto to enter into an agreement for use of the facilities,

NOW, THEREFORE, in consideration of the premises and the mutual agreements contained herein, the parties hereby agree as follows:

1. WCS will make available to CSCC two (2) classrooms at Fairview to be used for CSCC classes during the 2016-2017 school year.
2. CSCC shall provide part of the equipment needed to stock labs in order to fulfill the requirements of the Dual Credit courses and the Technical Certificate in Advanced Integrated Industrial Technology (see appendix D).
3. CSCC shall provide WCS with a calendar and schedule of class times no later than thirty (30) days before said usage shall begin. WCS shall provide a building monitor during the times of CSCC use after regular WCS school hours, at its own expense.
4. CSCC will provide access to the online lecture for dual enrolled WCS students in 2016-17 and WCS will provide said access to Dual Credit enrolled WCS students after year one of the agreement.

5. WCS shall have the authority to use the said equipment at all times during its regular school hours and other times during which CSCC is not using them for its classes.
6. WCS's Maintenance Department shall have the authority to maintain said equipment and repair as needed.
7. CSCC shall have use of the Fairview High School main parking lot to the extent necessary for its use of the classrooms.
8. CSCC will not at any time use or occupy the Premises in violation of laws, ordinances, or regulations of any government or agency having jurisdiction over said premises.
9. All CSCC employees and contractors shall comply with the criminal background checks and other statutory requirements of its employees and contractors.
10. The parties hereto shall comply with the terms of the Family Educational Rights & Privacy Act (FERPA), 20 USC §1232g, the Children's Internet Protection Act (CIPA), 47 USC §254(h), and other federal and state laws applicable to students.
11. CSCC is a public institution of higher education and a member of the State University and Community College System of Tennessee governed by the Tennessee Board of Regents. As a state entity its liability arising from performance under this agreement shall be subject to and limited to those rights and remedies, if any, available under T. C. A. §§ 9-8-101 through 9-8-407. WCS is a political subdivision of the state, and, as such, its liability to third parties for injuries which may result from its performance under this agreement shall be subject to and limited to those rights and remedies, if any, available under the Tennessee Governmental Tort Liability Act, §§ T. C. A. 29-20-201, et seq.
12. Each party shall be solely liable for payment of its portion of all claims, liability, costs, expenses, demands, settlements, or judgments resulting from action or omissions of itself or those for whom it is legally responsible, relating to or arising under this Agreement.

13. This Agreement shall in no way be interpreted as creating an agency or employment relationship between the parties.
14. This term of this agreement shall begin upon execution of this agreement and terminate on May 31, 2017 and shall automatically renew perpetually for one-year periods beginning June 1, 2017 unless terminated by either party upon written notice no later than May 1 of each year.

IN WITNESS WHEREOF, the parties have executed the above-written agreement on the date and year listed below, but effective as of the date first written above.

WILLIAMSON COUNTY SCHOOLS

By:_____ _____
Mike Looney, Ed.D., Superintendent Date

COLUMBIA STATE COMMUNITY COLLEGE

By:_____ 3.10.16
Janet F. Smith, Ph.D., President Date

Appendix A
Phase III
ASSOCIATE DEGREE CREDITS TEMPLATE
Revised 2-23-16

Subjects/Credits Needed		Ninth Grade 6.0 Credits	Tenth Grade 7.0 Credits	Eleventh Grade 7.0 Credits	Twelfth Grade 6.5 Credits
English	4.0	English I	English II	English III	English IV/1010 (DE – 3 hrs)
Math	4.0	Algebra I	Geometry	Algebra II	WCS College Algebra – State Dual Credit (3 hrs.)
Science	3.0	Biology I	Chemistry or Physics	Physical Science CSCC Dual Credit (4 hrs)	N/A
Social Studies 3.5*		World History		U.S. History	Economics (DE – 3 hrs)/U.S. Government
World Language	2.0		Spanish I	Spanish II	
Fine Arts	1.0	Study Hall			FrHS Fine Art/CSCC Fine Art (DE – 3 Sem. Hrs.)
Physical Ed	1.5	Wellness	P.E./*Personal Finance		Computer Apps/Mechatronics (DE – 6 hrs)
Electives	4.0	Technology Design	Mechatronics (Dual Credit – 6 hrs)	Mechatronics (DE – 6 hrs)	Mechatronics (DE – 6 hrs)
Electives	3.0		Mechatronics (Dual Credit – 6 hrs)	Mechatronics (DE – 6 hrs)	Mechatronics/Mechatronics Internship (DE – 6hrs)

Notes: Mechatronics **42 DE/DC hours**
Additional college coursework **19 DE/DC hours**
Total College Credit **61 Credit Hours**
Total High School Credit **26.50 Credits (22.0 required)**

Foundations of Technology completed in 8th grade
3-hour Mechatronics Internship to be completed during summer following junior year

This model would require a minimum of .50 credit be earned outside of the regular school day. High School Load could be lessened dependent upon student's beginning world language requirement in middle school or submission of a Foreign Language/Fine Arts Waiver (which would reduce total high school credits by 3.0) or a P.E. waiver (.50 credit). **Speech 1010 is now required.**

Appendix B

Phase I

Mechatronics Dual Credit Articulation

Mechatronics I to Articulate with Columbia State courses as follows:

Course	Credit Hours
• AIT 1001 Basic Electricity	2
• AIT 1002 Power Development	1
• AIT 1003 Hydraulic/Pneumatic Fundamentals	1
• AIT 1301 Principles of Instrumentation	2

Mechatronics II to Articulate with Columbia State courses as follows:

• AIT 1600 Workplace Safety	1
• AIT 1101 Electrical Power Distribution	1
• AIT 1102 Fluid Power Distribution	2
• AIT 1201 Electrical Installation	1
• AIT 1202 Piping & Pneumatic Installation	1

Mechatronics I Learning Objectives

After the completion of the course, the student should be able to do the following:

- ✓ Define electricity. Connect/operate power supplies while demonstrating input and output devices such as switches, buzzers, solenoids, and motors.
- ✓ Use both digital and analog voltmeters along with ammeters in measuring volts and current in series and parallel circuits.
- ✓ Explain Ohm's Law and Kirchhoff's Law and the needed calculations to figure total power in series and parallel circuits.
- ✓ Demonstrate knowledge of electromagnetism, inductance, and capacitance in series and parallel circuits.
- ✓ Troubleshoot both a short circuit and an open circuit issue in a basic light circuit.
- ✓ Connect and operate a transformer and demonstrate how to calculate the secondary coil as well as the output voltage of the transformer
- ✓ Determine the Brush Polarity of a DC Generator Using a DMM
- ✓ Connect and Operate a DC Series Generator.
- ✓ Connect and Operate a Self-Excited DC Shunt Generator.
- ✓ Connect and Operate a Separately-Excited DC Shunt Generator
- ✓ Connect and Operate a DC Compound Generator
- ✓ Read a Pneumatic Pressure Gauge.
- ✓ Connect and Adjust a Pressure Regulator.

Appendix B

Phase I

- ✓ Drain a Pneumatic Filter.
- ✓ Connect a Pneumatic Hose That Uses Quick-Connect Fittings.
- ✓ Use a Tee to Connect Two and Three Circuit Branches Together
- ✓ Connect and Operate a Double-Acting Pneumatic Cylinder Using a 3-Position, Manually-Operated DCV
- ✓ Design a Multiple Cylinder Pneumatic Circuit
- ✓ Connect and Operate a Single-Acting Pneumatic Cylinder Using a 3/2 Manually-Operated DCV
- ✓ Connect and Operate a Uni-Directional Pneumatic Motor Using a 3-way, Manually-Operated DCV
- ✓ Identify Pneumatic Symbols
- ✓ Draw a Pneumatic Schematic from the Actual Circuit Connections on the Machine
- ✓ Connect a Pneumatic Circuit Given a Schematic
- ✓ Design a Multiple Actuator Pneumatic Circuit
- ✓ Read a Hydraulic Pressure Gauge
- ✓ Read the Liquid Level and Temperature in the Reservoir
- ✓ Operate a Hydraulic Power Unit
- ✓ Connect and Disconnect a Hydraulic Hose That Uses Quick-Connect Fittings
- ✓ Use a Tee to Connect Two Circuit Branches Together
- ✓ Connect and Operate a Double-Acting Hydraulic Cylinder Using a 3-Position, Manually-Operated DCV
- ✓ Design a Dual Cylinder Hydraulic Circuit
- ✓ Connect and Read a Flow Meter
- ✓ Connect and Operate a Needle Valve to Control the Speed of an Actuator
- ✓ Control the Speed of an Actuator Using a Manually-Operated DCV
- ✓ Connect and Operate a Bi-Directional Hydraulic Motor Using a 3-Position, Manually-Operated DCV
- ✓ Draw a Hydraulic Schematic from the Actual Circuit Connections on the Machine
- ✓ Connect a Hydraulic Circuit Given a Schematic
- ✓ Design a Multiple Actuator Hydraulic Circuit
- ✓ Determine the manipulated and controlled variables given process descriptions.
- ✓ Manually control the liquid level in a tank using open and closed loop methods.
- ✓ Identify the type and location using an instrument tag.
- ✓ Draw an instrument tag given device information.
- ✓ Identify P&ID line, valve,, actuator, and pump symbols
- ✓ Interpret instrument data using an instrument index.
- ✓ Power up a Honeywell UDC 3500 controller and perform a display and key test.
- ✓ Connect and operate a loop controller in the manual mode

Mechatronics II Learning Objectives

After the completion of the course, the student should be able to do the following:

- ✓ Locate and apply OSHA Safety and Health standards, policies and procedures
- ✓ Utilize OSHA standards and regulations to supplement an on-going safety and health program

Appendix B

Phase I

- ✓ Identify common violations of OSHA standards and propose abatement actions
- ✓ Describe appropriate abatement procedures for selected safety and health hazard
- ✓ Obtain the 10 Hour General Industry OSHA Safety Training card
- ✓ Describe the Function of the Four Basic Parts of a Wiring System
- ✓ EMT Conduit Cutoff and Preparation
- ✓ Lay Out and Bend EMT with Proper Leg Length and Stub-Up.
- ✓ Bend IMC with a Mechanical Bender
- ✓ Cut and Connect Flexible Metal Conduit
- ✓ Select Wire Size and Type for an Application
- ✓ Use NEC Tables to Select the Proper Size Raceway for Same Size/Type Conductors
- ✓ Design and Install a Wiring System Given Specifications
- ✓ Connect and operate a needle valve to control actuator speed
- ✓ Design speed control circuits.
- ✓ Calculate the cylinder stroke given its size and a flow rate.
- ✓ Design a circuit to provide bypass flow
- ✓ Connect and operate a pressure sequence circuit.
- ✓ Design a hydraulic circuit that uses a pressure reducing valve
- ✓ Connect and operate a hydraulic 4/2 DCV
- ✓ Design a hydraulic sequence circuit using a cam operated hydraulic valve.
- ✓ Connect and operate a basic regeneration circuit
- ✓ Set up, adjust, and operate a cylinder synchronization circuit using flow control valves.
- ✓ Interpret an electrical print
- ✓ Determine the number of wires to run from a control panel to an operator station
- ✓ Wire an electrical panel
- ✓ Calculate the efficiency of a motor given input and output power.
- ✓ Select the correct DC motor for an application based on motor performance characteristics
- ✓ Connect and operate a split phase motor as well as a DC series generator
- ✓ Control the frequency of an alternator.
- ✓ Identify pipe function by color code
- ✓ Design and draw a piping schematic for a given application
- ✓ Use a pipe threading machine to cut threads on a pipe
- ✓ Install an expansion joint and pipe insulation
- ✓ Select and size plastic pipe for an application
- ✓ Determine bend locations and angles given a tubing layout drawing
- ✓ Determine hose length given a layout drawing and make the required hoses.
- ✓ Connect and operate a manually operated two-way valve which has threaded ports.
- ✓ Disassemble, repair, and test a two-way valve
- ✓ Disassemble and rebuild a Sloan valve.

Appendix C
Phase I
TECHNICAL CERTIFICATE CREDITS TEMPLATE

2/8/2016

Subjects/Credits Needed	Ninth Grade 6.0 Credits	Tenth Grade 7.0 Credits	Eleventh Grade 7.0 Credits	Twelfth Grade 6.5 Credits
English 4.0	English I	English II	English III	English IV/
Math 4.0	Algebra I	Geometry	Algebra II	College Algebra – State Dual Credit (3 hrs.)
Science 3.0	Biology I	Chemistry or Physics	???????	N/A
Social Studies 3.5*	World History		U.S. History	)/U.S. Government
World Language 2.0		Spanish I	Spanish II	
Fine Arts 1.0	Study Hall			FrHS Fine Art/
Physical Ed 1.5	Wellness	P.E./*Personal Finance		Computer Apps
Electives 4.0	Technology Design	?????	Mechatronics (DE – 6 hrs)	Mechatronics (DE – 7 hrs)
Electives 3.0		??????	Mechatronics (DE – 6 hrs)	Mechatronics/Internship (DE – 3hrs)

Notes: Mechatronics 22 DE hours
Additional college coursework 22 DE hours
Total College Credit 22 Credit Hours
Total High School Credit 26.50 Credits (22.0 required)

Foundations of Technology completed in 8th grade
3-hour Mechatronics internship to be completed during summer following junior year

This model would require a minimum of .50 credit be earned outside of the regular school day. High School Load could be lessened dependent upon student's beginning world language requirement in middle school or submission of a Foreign Language/Fine Arts Waiver (which would reduce total high school credits by 3.0) or a P.E. waiver (.50 credit).

Appendix D

Fall 2016 Start-up Equipment

AIT 1001	Basic Electricity	T7017	$5,000
AIT 1002	Power Development	85-MT2	$31,694
AIT 1003	Hydraulic/Pneumatic Fundamentals	850-H1, 85-BP	$ 18,260
AIT 1301	Principles of Instrumentation	T5552	$20,309
Spring	**2017**		
AIT 1600	Workplace Safety	None needed	
AIT 1101	Electrical Power Distribution	85-MT7	$16,500
AIT 1102	Fluid Power Distribution	85-IH (w/ 85-H1)	$14,000
AIT 1202	Piping, Pneumatic and Installation	950-PS1	$11,000
AIT 1203	Mechanical Installation	950-ME1	$14,932

Total **$131,776**

Appendix D

WCS Provided Equipment

85-MT2	$31,694
85-BP	4,760
85-IH	6,576
950-ME1	14,932
Total	$57,962

Columbia State Provided Equipment

T7017	$5,000
850-H1	13,549
T5552	20,309
85-MT7	16,500
950-ME1	10,200
Total	$65,558

(All prices do not include shipping and installation and are an estimate as of 2/22/2016)

ARTICULATION AGREEMENT
Mechatronics I
Advanced Integrated Industrial Technology – First 6 hours of AIT Course Work
Columbia State Community College
and
Williamson County Schools

STATEMENT OF INTENT

This agreement, entered into by the parties, will provide methods of advance placement to students who complete the stated courses, or a sequence of courses along with other specified requirements. The purpose of this agreement is to encourage students to build on past learning experience and eliminate unnecessary duplication of instruction.

AGREEMENT

This agreement will start with the beginning of the 2016-17school year and end June 30, 2021. This agreement may be terminated by either party by giving thirty (30) days written notice to the other.

The courses listed below have met the learning outcomes established by Columbia State Community College for the designated college courses.

High School Course	College Course	College Credits
Mechatronics I with a B or better for the equivalent of 1 credits.	AIT 1001 Basic Electricity	2
	AIT 1002 Power Development	1
	AIT 1003 Hydraulic/Pneumatic Fundamentals	1
	AIT 1301 Principles of Instrumentation	2

Additional Requirements:
Score 70% or higher on 4 comprehensive multiple-choice exams covering the concepts in each AIIT course. A variety of questions will be asked to assess knowledge, comprehension and application of concepts including demonstration of skills in a lab practicum. The exams will be administered during a timed 2 hour time block

PROCEDURES
Students wishing to participate in the articulation program must:

1. Meet specific performance requirements as outlined above.
2. Attend the Columbia State Community College assessment day and meet assessment requirements as stated.
3. Complete application for permission to take Credit by Exam and pay Credit by Examination fee (current fee for 2015-2016 is $25 per course.)
4. Pass the assessment requirements for each course for which credit is requested.
5. Enroll at Columbia State Community College within two (2) years of the date of graduation from high school and successfully complete 12 semester hours of resident credit (excluding development studies courses).
6. Contact the Science Technology and Mathematics Division at Columbia State Community College to request the articulated credit.

President, Columbia State Community College — Date 3.10.16

Director of Schools — Date

ARTICULATION AGREEMENT
Mechatronics II
Advanced Integrated Industrial Technology – Second 6 hours of AIT Course Work
Columbia State Community College
And
Williamson County Schools

STATEMENT OF INTENT

This agreement, entered into by the parties, will provide methods of advance placement to students who complete the stated courses, or a sequence of courses along with other specified requirements. The purpose of this agreement is to encourage students to build on past learning experience and eliminate unnecessary duplication of instruction.

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The courses listed below have met the learning outcomes established by Columbia State Community College for the designated college courses.

High School Course	College Course	College Credits
Mechatronics II with a B or better for the equivalent of 1 credits.	AIT 1600 Workplace Safety	1
	AIT 1101 Electrical Power Distribution	1
	AIT 1102 Fluid Power Distribution	2
	AIT 1201 Electrical Installation	1
	AIT 1202 Piping & Pneumatic Installation	1

Additional Requirements:
Score 70% or higher on 4 comprehensive multiple-choice exams covering the concepts in each AIIT course. A variety of questions will be asked to assess knowledge, comprehension and application of concepts including demonstration of skills in a lab practicum. The exams will be administered during a timed 2 hour time block

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6. Contact the Science Technology and Mathematics Division at Columbia State Community College to request the articulated credit.

03.10.16

President, Columbia State Community College — Date

Director of Schools — Date

ARTICULATION AGREEMENT
Mechatronics I
Advanced Integrated Industrial Technology – First 6 hours of AIT Course Work
Columbia State Community College
and
Maury County Schools

STATEMENT OF INTENT

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High School Course	College Course	College Credits
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	AIT 1002 Power Development	1
	AIT 1003 Hydraulic/Pneumatic Fundamentals	1
	AIT 1301 Principles of Instrumentation	2

Additional Requirements:
Score 70% or higher on 4 comprehensive multiple-choice exams covering the concepts in each AIIT course. A variety of questions will be asked to assess knowledge, comprehension and application of concepts including demonstration of skills in a lab practicum. The exams will be administered during a timed 2 hour time block

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5. Enroll at Columbia State Community College within two (2) years of the date of graduation from high school and successfully complete 12 semester hours of resident credit (excluding development studies courses).
6. Contact the Science Technology and Mathematics Division at Columbia State Community College to request the articulated credit.

3.8.16

President, Columbia State Community College — Date

Director of Schools — Date

ARTICULATION AGREEMENT
Mechatronics II
Advanced Integrated Industrial Technology – Second 6 hours of AIT Course Work
Columbia State Community College
And
Maury County Schools

STATEMENT OF INTENT

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Mechatronics II with a B or better for the equivalent of 1 credits.	AIT 1600 Workplace Safety	1
	AIT 1101 Electrical Power Distribution	1
	AIT 1102 Fluid Power Distribution	2
	AIT 1201 Electrical Installation	1
	AIT 1202 Piping & Pneumatic Installation	1

Additional Requirements:
Score 70% or higher on 4 comprehensive multiple-choice exams covering the concepts in each AIIT course. A variety of questions will be asked to assess knowledge, comprehension and application of concepts including demonstration of skills in a lab practicum. The exams will be administered during a timed 2 hour time block

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2. Attend the Columbia State Community College assessment day and meet assessment requirements as stated.
3. Complete application for permission to take Credit by Exam and pay Credit by Examination fee (current fee for 2015-2016 is $25 per course.)
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6. Contact the Science Technology and Mathematics Division at Columbia State Community College to request the articulated credit.

President, Columbia State Community College — Date 3.10.16

Director of Schools — Date

COLUMBIA STATE COMMUNITY COLLEGE
AIT 2400 SYLLABUS

WORK BASED LEARNING

Work Hours: Minimum of 180 hours

Credit Hours: 3
Room/Times: TBA

Instructor:
Office:
Phone:
Email:
Best way to contact: E-mail

Division Office: Warf 111
Dean: Dearl Lampley
Secretary: Freda Werner
Note: This course is not designed for transfer credit.

Catalog Course Description:

This work based learning course requires students to apply safety, critical thinking, problem-solving, professional behaviors, and communication skills to a real manufacturing environment.

Prerequisites:

Students must have completed one semester in the AIIT program including AIT 1600, Workplace Safety, and instructor's permission.

Textbook and Course Materials:

No required text. Handouts will be provided.

Learning Outcomes:

The academic assignments are specifically designed with the intent to enrich the learning experience throughout the internship.

- Understand the demands and needs of a career in manufacturing.
- Apply knowledge gained in previous courses to a wide range of manufacturing problems.
- Demonstrate skills in the areas of safety, leadership, knowledge, teamwork, decision-making, communication, and effective management of resources.

Attendance Policy:

Students are required to work a *minimum of 180 hours* at the internship location. The internship location cannot be an "at-home" business or run by immediate family members. Time sheets and the employer's evaluation of your work quality will be used to judge attendance. If the employer decides your attendance was unsatisfactory, you will receive a grade of F or FA (Failure due to Attendance).

GRADE CALCULATION

Course grades are determined through a variety of measures. Completion of the internship hours, a satisfactory Employer Evaluation, and the Final Reflection Paper are mandatory to receive a passing grade. **No late work will be accepted**. All grades will be posted in the Online Campus grade book.

Measure	Explanation	% of Grade
Internship Learning Assignments	• Organizational Introductory Paper (100 pts) • (3) Class Discussion Topics (25 pts each)	12%
Reflective Journals	• (5) Reflective Journals (75 pts each)	26%
Internship Performance	• Time Sheets showing 120 hours (160 pts) • Site Visit (75 pts) • Employer Evaluation (150 pts)	27%
Final Paper	• Final Reflection Paper (225 pts) • Quiz (50 pts) • Student Evaluation of Employer (75 pts) • Presentation (155 pts)	35%
TOTAL	Points assigned = 1440 pts.	100%

ORGANIZATIONAL INTRODUCTORY PAPER

Purpose:

An Organizational Introductory Paper describes the organization as a whole and your place within the organization.

Guidelines:

The Organizational Introductory Paper should be a ***minimum of two pages, typed and double-spaced, with Arial text, 1 inch margins, and 12 point font***. You must address the topics below and use headings to divide each topic within your paper (i.e. Mission; Client/Customers; Products/Services; Key Personnel; My Exposure):

- The mission of the organization
- The clients/customers of the organization
- The products/services of the organization
- The key individuals with whom you will be working
- Areas of the organization to which you will be exposed

Grading:

Satisfactory assessment of the Organizational Introductory Paper is based on:

- Comprehensive background knowledge relating to the internship organization (i.e. Mission, Clients/Customers, Products/Services, etc.).
- Clear understanding of your role/responsibilities, and that of others you will be working with
- An understanding of what you will be exposed to throughout the experience
- Adherence to the writing guidelines for the paper and timely completion

REFLECTIVE JOURNALS

Purpose:

The Reflective Journals are the primary place for demonstrating meaningful reflection as you address the Learning Outcomes, resolve problems and challenges, and document observations and feelings relating to your internship. The goals of your reflective journal are as follows:

- To provide a forum for deep reflection on the internship experience (i.e. observations, projects/tasks, challenges, etc.)
- To provide an opportunity to highlight the progress towards achieving the Learning Outcomes
- To provide a venue for the internship instructor's constant monitoring, coaching, and assessment of the internship experience.

Guidelines:

Each of the **5** Reflective journal entries should be a ***minimum of 2 pages, typed and double-spaced, with Arial font, 1 inch margins, and 12 point font***. You must address the topics below and use headings to divide each reflection topic within your journal (i.e. Specific Tasks, Learning Outcomes, Challenges & Resolutions, etc.).

- Specifics about jobs/tasks/projects accomplished, and how classroom knowledge has helped
- What you have learned and how you learned it
- Problems encountered with job assignments or work environment, and efforts toward resolution.
- Description of what is most impressive about your internship to date
- Expectations for the following weeks

Tip: It is recommended that you keep a daily log that documents your experience. Set aside at least 20 minutes, preferably at the same time each day to write. Make writing in the journal a habit, or the weeks will fly by, and you will have little record of your experience for future reflection.

Grading:

Satisfactory assessment of the Reflective Journal is based on:

- Evidence of thoughtful reflection, critical thinking, problem solving, complex interpretation
- Consistent reference to learning
- Demonstrated awareness of self in the work environment and the role of others

- Adherence to the writing guidelines for reflective journals and timely completion.

TIME SHEETS

Purpose:

The purpose of the **5** time sheets is to help monitor your contact hours at the intern site. The more contact that you have at the internship site, the greater the opportunity is to learn about the organization, industry, and/or career field.

Guidelines:

It is the student's responsibility to keep an accurate account of the time spent at the job site or in job related activities. Travel time to and from the internship is not to be included in the hours. Generally, lunches are not included; however, if the lunch is a "working" lunch, then the student may report those hours. The Time Sheet form must be signed by both the student and the site supervisor and submitted to the instructor (Dropbox, fax, e-mail scan, in person). All 180 required internship hours and class activities must be completed by the end of the semester.

Tip: It is recommended that you keep a daily log that documents your internship hours.

Grading:

Satisfactory assessment of the Time Sheet is based on:

- Overall completion of internship hours based on course registration
- Adherence to the Time Sheet guidelines

CLASS DISCUSSION TOPICS

Purpose:

The Class Discussion Topics provide an opportunity for fellow interns to collaboratively reflect on and explore in depth various topics relating to the professional work environment. The goals of Class Discussion Topics are as follows:

- To provide a forum for interns to learn about each other's internship site and work-related projects
- To provide an opportunity for interns to synthesize and connect various theories and concepts to their experiences (i.e. effective communication, leadership, initiative, ethics in business, etc.)
- To provide an opportunity for the Internship Instructor to coach, advise, facilitate problem-solving, and inspire critical thinking/creative thinking.

Guidelines:

You are required to start a "New Thread" when answering the Class Discussion Topic and must "reply" to at least **2** original threads of your classmates. Some discussion topics may require you to read an article or watch a video that relates to the topic. In an effort to help facilitate a meaningful discussion, all postings (new threads or replies) must be a **minimum of 4 sentences**. Also, your "reply" must be a substantive response. You cannot simply state that you agree/disagree and just reiterate what the originator wrote.

Furthermore, please remember to keep your postings professional and be respectful of each other's experiences. This is not a forum for you to slam the organization, co-workers, or career field. Finally, check for spelling and grammatical errors, and avoid using "texting" jargon. The instructor reserves the right to not accept and delete inappropriate or inadequate postings.

- Class Discussion Topic #1: Effective Communication
- Class Discussion Topic #2: Team Building
- Class Discussion Topic #3: Initiative

Grading:

Satisfactory assessment of the Class Discussion Topic is based on:

- Written responses to discussion topics that convey understanding, application, and thoughtful reflection
- Engaged participation in discussion, which not only shares insights and observations from own experience, but also explores issues presented by other classmates
- Adherence to the writing guidelines for Class Discussion Topics and timely completion.

SITE VISIT

Purpose:

The Site Visit allows you to introduce the instructor to the work environment and gives you an opportunity to express any concerns. The goals for the Site Visit are as follows:

- To gather systematic feedback on the progress of the internship to date from the perspective of all three parties in the partnership (i.e. feedback from the student, site supervisor, and instructor)
- To reassess and plan for the second half of the internship
- To provide an academic presence in the workplace and gather needed information for continued development of the program.

Guidelines:

It is the ***student's responsibility*** to schedule a 30-45 minute Site Visit meeting with the site supervisor, instructor, and him/herself. The Site Visit is similar to the midterm evaluation and should be scheduled during weeks 6 and 7. Please check Online Campus for the instructor's availability. If for some reason a Site Visit cannot be conducted, you should request that your site supervisor complete a Mid-term Performance Evaluation to provide you feedback. The Mid-term Performance Evaluation form is located in Online Campus, and a copy must be submitted to the instructor.

Grading:

Satisfactory assessment of the Site Visit is based on:

- Adherence to the Site Visit guidelines.

EMPLOYER AND STUDENT EVALUATIONS

Purpose:

The evaluations are assessment tools for the site supervisor and the student to provide their feedback regarding the internship experience. The site supervisor is strongly encouraged to discuss the evaluation with the student.

Guidelines:

It is the student's responsibility to request an Employer Evaluation prior to the conclusion of the internship. Your request for the Employer Evaluation should coincide with when you provide your 2-3 weeks' notice of your last day at the internship site. Both the Employer and Student Evaluation forms are available on Online Campus, and they must be submitted with your final paper. Please remember that you must receive an overall satisfactory evaluation to receive academic credit for the internship course.

Finally, it is strongly encouraged that you write a "Thank You" letter to your site supervisor for the internship experience. Please contact your Instructor if you need information on how to properly write a "Thank You" letter.

Grading:

Satisfactory assessment of the Evaluation is based on:

- Adherence to the Evaluation guidelines.

FINAL REFLECTION PAPER

Purpose:

Whereas the Reflective Journals are your ongoing record of specific analysis, the final paper provides an opportunity to reflect on the entire internship experience. The final reflection paper should summarize your learning, assess overall success in achieving your objectives, and highlight any additional insights about the organization, industry, or career field. The goals of the final reflection paper are as follows:

- To provide an opportunity for the student to reflect on and synthesize the full experience, and to analyze personal and professional effectiveness
- To facilitate closure of the internship experience.

Guidelines:

The Final Reflection Paper should be a ***minimum of 5 pages, typed and double-spaced, with Arial text, 1 inch margins, and 12 point font***. You must answer the questions below and use headings to divide each reflection topic within your paper (i.e. Company's Strengths and Weaknesses, Challenges & Resolutions, etc.)

- Based on your observations, what are the company's strengths and weaknesses?
- What are your strengths and weaknesses?
- What was your biggest challenge during this internship?
- What skills do you wish you had acquired before beginning this internship that would have made it easier for you to complete assigned tasks?
- How were you able to apply classroom knowledge to your internship experience?
- How can you (or other interns) utilize this experience when re-entering the classroom or workplace?
- What characteristics would the ideal intern possess to excel at this internship site?
- How has this internship solidified or changed your career focus?

Grading:

Satisfactory assessment of the Final Reflection Paper is based on:

- Demonstrated ability to synthesize and analyze the experience
- Demonstrated awareness of self as the experiential learner
- Adherence of the Final Paper guidelines

FINAL PRESENTATION

Purpose:

The purpose of the final presentation is to give the student an opportunity to discuss what he/she has learned during the internship process. This is the student's chance to share experiences of on-the-job training. The goals of the final presentation are as follows:

- To provide an opportunity for the student to verbalize experiences, things learned, and overall perceived effectiveness of the internship
- Showcase presentation skills

Guidelines:

Presentations can either be given in-person May 1 during the class period or can be turned in the Wednesday before the scheduled exam period via a link to a YouTube video. I must see your face in the YouTube video.

In the final presentation you must answer the following questions:

- Based on your observations, what are the company's strengths and weaknesses?
- What are your strengths and weaknesses?
- What was your biggest challenge during this internship?
- What skills do you wish you had acquired before beginning this internship that would have made it easier for you to complete assigned tasks?
- How were you able to apply classroom knowledge to your internship experience?
- How can you (or other interns) utilize this experience when re-entering the classroom or workplace?
- What characteristics would the ideal intern possess to excel at this internship site?
- How has this internship solidified or changed your career focus?

Grading:

Satisfactory assessment of the Final Presentation is based on:

- Adherence of the Final Presentation guidelines

WEEK	DATE	ASSIGNMENTS	DUE DATE
1	January 23	• Review your resume • Find an Internship *The internship location cannot be an "at-home" business or run by immediate family members.* • Turn in paperwork • Upload a picture to profile in Online Campus • Begin Internship ASAP	
2	January 30	• Organization Introductory Paper	Feb. 6
3	February 6	• Online Discussion Topic #1: Communication • Reflective Journal #1	Feb. 20
4	February 13	• Time Sheet #1	Feb. 27
5	February 20	• Reflective Journal #2	Mar. 6
6	February 27	• Online Discussion Topic #2: Team Building • Quiz	Mar. 6
7	March 6	• Reflective Journal #3	Mar. 20
8	March 13	• Spring Break	
9	March 20	• Online Discussion Topic #3: Initiative	Mar. 27
10	March 27	• Reflective Journal #4 • Time Sheet #2	Apr. 3
11	April 3	• Provide Site Supervisor a 2-3 week notice	Apr. 10
12	April 10	• Reflective Journal #5 • Time Sheet #3	Apr. 17
13	April 17	• Request Employer Evaluation from Site Supervisor • Create a "Thank You" letter for Site Supervisor	Apr. 24
14	April 24		
15	May 1	• Final Reflection Paper • Employer Evaluation • Student Evaluation form • Time Sheet #4 • Presentations	May 1

Dr. Juli L. Oyer
Principal

2595 Fairview Blvd.
Fairview, TN 37062
(615) 472-4400

June 17, 2016

To Whom It May Concern,

Fairview High School, on behalf of Williamson County Schools, is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs. The partnership with CSCC allows this project to occur on the campus of Fairview High School. This models lends itself to success by removing multiple barriers for students and their families and giving them access to exceptional CTE programming on our campus.

We believe this extraordinary approach to technical education is the wave of the future—offering student multi-leveled opportunities for success while providing them access in their own community offers experiences that we believe can change lives. Lastly, we believe this approach supports the economic and workforce development by providing faster access to quality employees for Williamson County manufacturing employers and those in our State.

We look forward to working with you and your students in the coming years.

Sincerely,

Juli L. Oyer

Juli L. Oyer, Ed. D.

Dr. Christopher J. Marczak
Director of Schools

Maury County Public Schools
501 West 8th Street, Columbia, TN 38401
(931) 388-8403

Scott A. Gaines
Assistant Director of Curriculum & Instruction

Stan J. Breeden
Assistant Director of Operations

June 22, 2016

Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, Tennessee 37243-0830

Governor Haslam and Tennessee Higher Education Commission,

The Maury County Public School District is pleased to offer a letter of support in regard to the LEAP Grant as developed by Columbia State Community College. In accordance with the needs of Maury County, as well as the adjacent counties in which we serve, they have developed the MAC Pro (Mechatronics Accelerated Completion Program) LEAP Grant proposal. MAC Pro will be an answer to the workforce needs in Maury County.

The Maury County Public School District looks forward to our ongoing partnership with Columbia State Community College in this endeavor.

Sincerely,

Lori L Brown

Lori L. Brown, Ed. D.
Supervisor of College, Career, and Technical Education
Maury County Public Schools
501 West 8th Street
Columbia, Tennessee 38401
Office 931-388-8403 Ext. 8126
Cell 931-626-3204
Fax 931-840-4410

Horn USA, Inc.
320 Premier Court, Suite 205
Franklin, TN 37067
Tel: (615) 771-4100
Fax: (615) 771-4101

Excellence in Technology

May 17, 2016

President Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

Dear President Smith,

Horn USA is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs.

The opportunities for the application of this type of skill is great for our company and those that supply our inputs. Horn USA is involved with various education and industry associations throughout North America and this LEAP program is one of the best we have seen. This new approach to technical education will not only guarantee us faster access to more quality staff, but will strengthen the relationship between Horn USA and Columbia State.

We look forward to working with you and your students in the coming years.

Sincerely,

David Fabry
Operations Manager

AOC METAL WORKS
2009 Liberty Ave, PO Box #98,
Lawrenceburg, TN 38464
931-766-7750 - 931-766-7753 Fax

May 18, 2016

President Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

President Smith,

AOC MetalWorks is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs. The opportunities for the application of this type of skill is great for our company and our supply base.

This new approach to technical education will not only guarantee us faster access to more quality staff, but will strengthen the relationship between AOC MetalWorks and Columbia State. We look forward to working with you and your students in the coming years.

Sincerely,

Thomas F. Collins

Thomas F. Collins
President & CEO

NISSAN GROUP
OF NORTH AMERICA

Randy Knight
Vice President
Manufacturing

Nissan North America, Inc.
983 Nissan Drive
Smyrna, TN 37167

Office: 615-459-1400

May 18, 2016

President, Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

Dear President Smith,

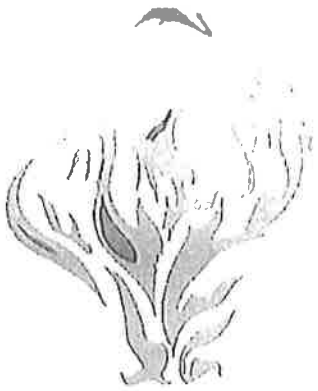
Nissan North America, Inc. is pleased to offer its support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will provide skilled workers for all area manufacturers and ensure that Middle Tennessee will have the workforce needed to sustain advanced manufacturing jobs.

This proposed educational pathway is a creative approach to technical education. It will provide students the opportunity to start their career sooner with the skills that are needed and sought after by employers. This program will not only guarantee us faster access to qualified job applicants but will strengthen the relationship between Nissan and Columbia State. We look forward to working with you and your students in the coming years.

Sincerely,

Randy Knight

Randy Knight



June 29, 2016

President Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

President Smith,

Phoenix Metals Company is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs. The opportunities for the application of this type of skill is great for our company and those that supply our inputs.

This new approach to technical education will not only guarantee us faster access to more quality staff, but will strengthen the relationship between Phoenix Metals and Columbia State. We look forward to working with you and your students in the coming years.

Sincerely,

Operations Manager

EST. 1927
COLUMBIA MACHINE WORKS INC.

Providing Complete Manufacturing Support and Solutions

June 17, 2016

President Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

President Smith,

Columbia Machine Works, Inc. is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs. The opportunities for the application of this type of skill is great for our company and those that supply our inputs.

This new approach to technical education will not only guarantee us faster access to more quality staff, but will strengthen the relationship between <insert company name> and Columbia State. We look forward to working with you and your students in the coming years.

Sincerely,

COLUMBIA MACHINE WORKS, INC.

John K. Langsdon, III
President

Phone: 931-388-6202 | Nashville: 615-254-6005 | Fax: 931-388-8128 | 1940 Oakland Parkway | Columbia, TN 38401

Smelter Service Corp.

June 29, 2016

President Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

President Smith,

Smelter Service Corp. is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs. The opportunities for the application of this type of skill is great for our company and those that supply our inputs.

This new approach to technical education will not only guarantee us faster access to more quality staff, but will strengthen the relationship between Smelter Service Corp. and Columbia State. We look forward to working with you and your students in the coming years.

Sincerely,

Maintenance System Leader
Smelter Service
Mt. Pleasant TN

May 18, 2016

President Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

President Smith,

APCOM is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs. The opportunities for the application of this type of skill is great for our company and those that supply our inputs.

This new approach to technical education will not only guarantee us faster access to more quality staff, but will strengthen the relationship between APCOM and Columbia State. We look forward to working with you and your students in the coming years.

Sincerely,

Tina McKeithan

Tina McKeithan
Human Resources Manager
APCOM-A Division of A.O. Smith
125 SE Parkway, Franklin, TN 37064
(615) 794-5574

Accurate Energetic Systems, LLC

5891 Highway 230 West • McEwen, Tennessee 37101
• Telephone: (931)729-4207 • Fax: (931)729-4217
www.aesys.biz

May 18, 2016

President Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

Dear President Smith:

Accurate Energetic Systems, LLC is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs. The opportunities for the application of this type of skill is great for our company and those that supply our inputs.

This new approach to technical education will not only guarantee us faster access to more quality staff, but will strengthen the relationship between Accurate Energetic Systems, LLC and Columbia State. We look forward to working with you and your students in the coming years.

Sincerely,

ACCURATE ENERGETIC SYSTEMS, LLC

Paula Pittman
VP Human Resources/Compliance

MPPS
MOUNT PLEASANT POWER SYSTEM

DEREK D CHURCH
GENERAL MANAGER

ALBERT W KERSTIENS
ASST. GEN. MANAGER

June 17, 2016

President Janet Smith
Columbia State Community College
1665 Hampshire Pike
Columbia, TN 38401

President Smith,

The Mount Pleasant Power System (MPPS) is pleased to offer our support and partnership for your 2016 Labor and Education Alignment Program (LEAP) grant proposal. The opportunity for Mechatronics trained students to complete degree or technical certificates earlier than normal paired with the expansion of Columbia State's Advanced Integrated Industrial Technology AAS Degree Program will ensure that this area will have the workforce it requires for its Advanced Manufacturing needs. The opportunity for the application of this type of skill is great for our company.

This new approach to technical education will not only guarantee us faster access to more quality staff, but will strengthen the relationship between MPPS and Columbia State. We look forward to working with you and your students in the coming years.

Sincerely,

Albert W. Kerstiens, P.E.
Assistant General Manager
Mount Pleasant Power System

P.O. BOX 186 • MOUNT PLEASANT, TENNESSEE 38474-0186 • PHONE (931) 379-3233 • FAX (931) 379-9223

VITA

DEARL DOUGLAS LAMPLEY

Education:	Public Schools, Fairview, Tennessee
	B.S. Agriculture, University of Tennessee, Knoxville, Tennessee
1979	
	M.S. Agriculture, University of Tennessee, Knoxville, Tennessee
1981	
2015	Ed.D. Educational Leadership, East Tennessee State University
Professional Experience:	Dean of Science Technology and Math, Columbia State Community College 2010-2016
	Professor of Agriculture, Columbia State Community College 1998-2016
Presentations:	"Agriculture in Tennessee Community Colleges" presented at 2004 Tennessee University Agriculture Instructors Conference
	"Cryptosporidium Outbreak in Columbia State Veterinarian Technology Students" presented at 2002 Symposium of Communicable Diseases. Atlanta, GA
Professional memberships:	Association of Technology, Management, and Applied Engineering
	Nashville Technology Council
	Tennessee Academy of Science